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Data carrier with a battery and a display

This invention relates to a data carrier, in particular a smart card, with a battery and a display.

For payment transactions there has been introduced in recent years a money card, a so-called electronic purse, which is formed by a smart card. At suitably designed terminals one can load amounts of money into the electronic memory of the smart card to be used later for the payment of purchases.

Known smart cards have the disadvantage, however, that the user cannot see which amount of money is still available. The article "Dünn wie Papier," Wirtschaftswoche, 21 Jan. 1999, discloses a smart card that permits a user to find out the particular amount of money available. The smart card has for this purpose a display that is supplied by a flat battery and can be activated by means of a switch.

Because of the small volume of the smart card, it must be guaranteed for a long life that the display is only supplied with power when this is intended by the user of the smart card. This cannot be reliably guaranteed in the known smart card since smart cards are usually kept in wallets or billfolds. The probability of inadvertent operation of the switch is therefore very high since in the wallet or billfold the smart card is constantly subjected to pressure from both sides which can also act on the switch. This would lead to relatively rapid discharge of the battery, thereby reducing the life of the smart card altogether.

FR 2 725 084 and FR 2 694 439 disclose providing a switch between a battery and a display. The switch is driven by a solar cell and permits operation of the display only in case sufficient light is present.

It is therefore the problem of the present invention to state a data carrier, in particular a smart card, in which no inadvertent discharge of the battery can occur and which is simply realized.

This problem is solved by the features of the single claim.

The invention starts out from the idea that the data carrier has a solar cell. The solar cell changes its resistance in inverse proportion to brightness. At low brightness the current flow between battery and display is thus interrupted.

[corresponding to pp. 2 and 3 of German text]

The advantage of the invention is to be seen in that the above-described problem of inadvertent operation of the display in particular in a billfold or wallet can be reliably avoided since virtually complete darkness prevails in such receptacles. Current flow between battery and display is therefore reliably prevented. Additionally, operation of the display is always prevented when insufficient brightness is present for the display to be read.

Further advantages of the present invention will result from the following description with reference to a figure.

Sub P1 The single figure shows the schematic structure of an inventive data carrier.

Sub P1 The figure shows a data carrier comprising carrier 1 with electronic circuit 2, display 3, battery 5 that is connected with display 3 via switch 4, and device 6 for detecting the usability or probability of use of display 3.

Sub P1 Display 3 is used for representing data contained in electronic circuit 2. Display 3 can be activated via switch 4 and then indicates the data content of circuit 2. Such a data content may be e.g. the credit balance of an electronic purse. Unlike the schematic structure of the data carrier shown in the figure, a different structure can be chosen. For example, electronic circuit 2 may not be a contact-type one as shown, but a contactless one. Electronic circuit 2 then has suitable coupling elements, e.g. antennas. Electronic circuit 2 may furthermore also be supplied with power by bat-